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Operation and Maintenance Manual for the Common Video End Effector System (CVEE) System 6260

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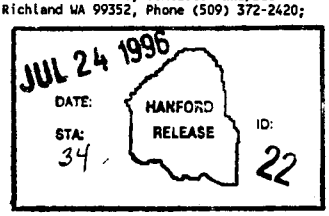
Abstract: This document defines the requirements for the operation, maintenance, and storage of the Common Video End Effector System (CVEE) used with the video end effectors as part of the Light Duty Utility Arm (LDUA) system.



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OPERATION AND MAINTENANCE MANUAL FOR THE COMMON VIDEO END EFFECTOR SYSTEM (CVEE) SYSTEM 6260

TRADEMARKS

Opto-22 is a trademark of OPTO22 Corp.
KEPCO is a trademark of Kepco Inc.
Labview is a trademark of National Instruments Corp.

OPERATION AND MAINTENANCE MANUAL FOR THE COMMON VIDEO END EFFECTOR SYSTEM (CVEE)

This document defines the requirements for the operation, maintenance, and storage of the Common Video End Effector System (CVEE) used with the video end effectors as part of the Light Duty Utility Arm (LDUA) system.

1.0 GENERAL INFORMATION

1.1 Introduction

The Common Video End Effector System (CVEE), system 6260, is a control and data acquisition interface between the various video end effectors and the Supervisory Data Acquisition System (SDAS).

1.2 Equipment Description

The system consists of the CVEE support electronics chassis and the CVEE power supply chassis. The CVEE support electronics chassis contains the Opto-22[1] modules and the lighting power supply, and the Power Supply chassis contains power supplies for camera and motors. These two sets of electronics are mounted in the At Tank Instrument Enclosure (ATIE) as shown in Figure 1.

All video and end effector functions are controlled by the LDUA Supervisory Data Acquisition System using the CVEE interface.

In the event of a low purge pressure, a signal from the LDUA control system will be provided to the Power Supply chassis to instigate a shutdown of all power to the end effector.

[1] Opto-22 is a trademark of OPTO22 Corp.

1.3 Reference Documents

The documents listed may be consulted as a source of information for the basic requirements of the LDUA CVEE.

CVEE CHASSIS AND POWER SUPPY CHASSIS DRAWINGS

CVEE CHASSIS

H-6-14270 Rev. A	Sheet 1 of 9	Common Video End Effector (CVEE) Support Electronics
H-6-14270 Rev. A	Sheet 2 of 9	OAS and CVEE end to end drawing
H-6-14270 Rev. A	Sheet 3 of 9	HRSVS and CVEE end to end drawing
H-6-14270 Rev. A	Sheet 4 of 9	Common Video End Effector (CVEE) Chassis Layout
H-6-14270 Rev. A	Sheet 5 of 9	CVEE Chassis Preparation
H-6-14270 Rev. A	Sheet 6 of 9	CVEE Chassis Wiring Diagram (Part A)
H-6-14270 Rev. A	Sheet 7 of 9	CVEE Wiring Diagram (Part B)
H-6-14270 Rev. A	Sheet 8 of 9	CVEE/Kepco[2] Interface
H-6-14270 Rev. A	Sheet 9 of 9	CVEE/PC Serial Connections

POWER SUPPLY DRAWINGS

H-6-14271 Rev. A	Sheet 1 of 3	WHC Power Chassis Layout (CVEE)
H-6-14271 Rev. A	Sheet 2 of 3	WHC Power Chassis Wiring Diagram (CVEE)
H-6-14271 Rev. A	Sheet 3 of 3	WHC Power Chassis Schematic (CVEE)

[2]Kepco is a trademark of Kepco Inc.

2.0 SPECIAL REQUIREMENTS

2.1 Utilities Required

Utilities are supplied to each video end effector by the CVEE. The CVEE is located within the ATIE and is connected to the actual end effector utilizing the ATIE cabling and the umbilical located within the LDUA. The power requirement for the CVEE and power supply chassis is one each, 120 Vac/60 Hz, single phase.

2.2 Special Tools and Equipment

The CVEE requires no special tools or equipment for installation and operation.

2.3 Calibration

The CVEE does not require calibration.

2.4 Safety

The following safety considerations shall be considered when operating and maintaining the CVEE system.

2.4.1 Personnel Precautions

- All operation and maintenance shall be performed in accordance with applicable safety requirements as stipulated in WHC safety documents.
- Before beginning a task, the Person-In-Charge (PIC) is responsible to assure that all personnel taking part in the operation of the CVEE have been briefed on it operation and that they understand the task being performed and any hazards associated with it.

2.4.2 Equipment Precautions

- Avoid contact with the 120Vac power connections on connection strips.

3.0 SETUP AND OPERATION

This section provides instructions for the normal handling and operation of the CVEE in support of routine operations of the LDUA within a Hanford tank.

3.1 Equipment Setup

3.1.1 The CVEE will be mounted in the ATIE as shown in Figure 1. The necessary cabling will be connected to the back of the CVEE (Figure 2).

3.1.2 Proper CVEE cable connections are shown in Figure 3.

3.1.3 Under normal operation the CVEE chassis and CVEE power supply chassis will be energized and all cable connections between the CVEE chassis and the LDUA interface will be made. Therefore once an end effector is placed on the arm the system will be ready for operation. Operation of the CVEE is performed utilizing SDAS.

3.2 Theory of Operation

3.2.1 The CVEE is equipped with power supplies to perform motor operation and supply voltage to the lighting. These supplies are actuated using relays connected to the Opto-22 logic boards.

3.2.2 SDAS provides a digital input (RS-232 to RS-485) to the Opto-22 brain board to turn on and off lights, and turn motors on and off. Analog data is provided back to SDAS using the Opto-22 analog modules.

3.2.5 SDAS utilizes a Labview[3] software produced virtual instrument to perform all of the necessary camera and lighting functions supported by the end effectors.

[3] Labview is a trademark of National Instruments Corp.

4.0 MAINTENANCE

4.1. Scheduled Maintenance

Scheduled maintenance is that preventive maintenance that is performed on the CVEE at regular time intervals. The PIC shall be responsible for assuring that the designated maintenance activities are accomplished at the appropriate time interval as specified below.

Unless specifically directed otherwise, all maintenance shall be done with the CVEE and support electronics disconnected from the power source.

4.1.1 Daily Maintenance (i.e. each additional 8 hours of operating time)

- Perform a general visual inspection.

4.1.2 Weekly Maintenance (i.e. each additional 40 hours of operating time)

- Perform a general visual inspection.

4.1.3 Six-Month Maintenance (i.e. each additional 172 hours of operating time)

- Perform a general visual inspection.

4.1.4 Twelve-Month Maintenance (i.e. each additional 344 hours of operating time)

- Replace all relays.

4.2 Corrective Maintenance

Corrective maintenance addresses those situations where remedy is required to correct component failures which occur unexpectedly, and are therefore not performed in accordance with a schedule. Rigorous adherence to scheduled preventive maintenance should minimize the need to perform corrective maintenance. The components in the CVEE are expected to have a reasonably long operating life, and corrective maintenance activities are minimal. The following items have been identified as potential corrective maintenance activities. A recommended spare parts list has been included in Appendix A. A complete parts list can be found on the CVEE assembly drawing. Component original equipment manufacturer (OEM) documentation can be found in the CVEE subsystem component specification file. The OEM documentation should provide sufficient information to assist in the adjustments or maintenance activities for the specific component.

Performance of unscheduled maintenance may require access to the LDUA SDAS and associated equipment for system checkout.

1) Relay replacement (Figure 4)

   a. Unscrew the rack mounting of the CVEE support electronics chassis and pull out the chassis just far enough to remove the top cover.
   b. Remove each relay and install the new one in the same place. Make sure each new relay is seated fully into its socket.
   c. Reinstall the top cover.
   d. Power the CVEE to verify proper operation.
   e. Perform this same procedure to replace the relays in the CVEE power supply chassis.

5.0 STORAGE

During normal operation the of the LDUA system, the CVEE will reside in the ATIE protected from cold, heat, and the environment.

APPENDIX A -- FIGURES

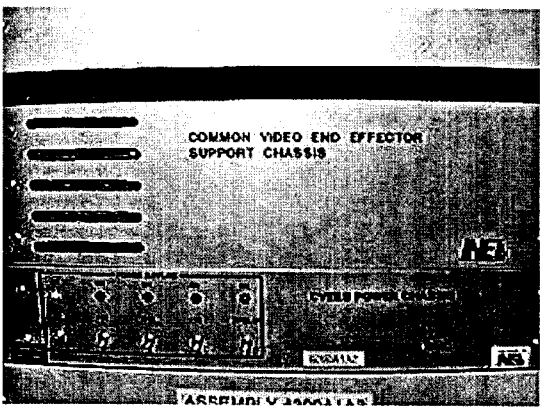

Figure 1 CVEE Support Chassis and CVEE Power Supply Chassis

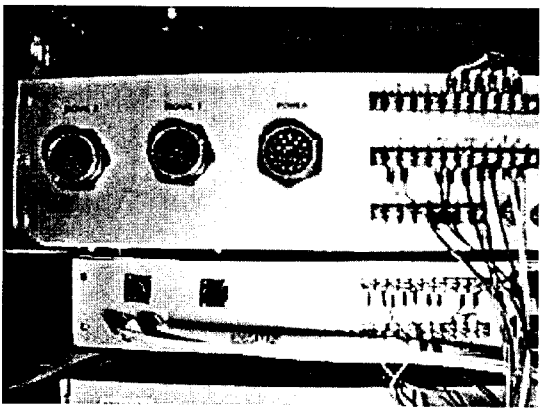

Figure 2 Back Panels of CVEE

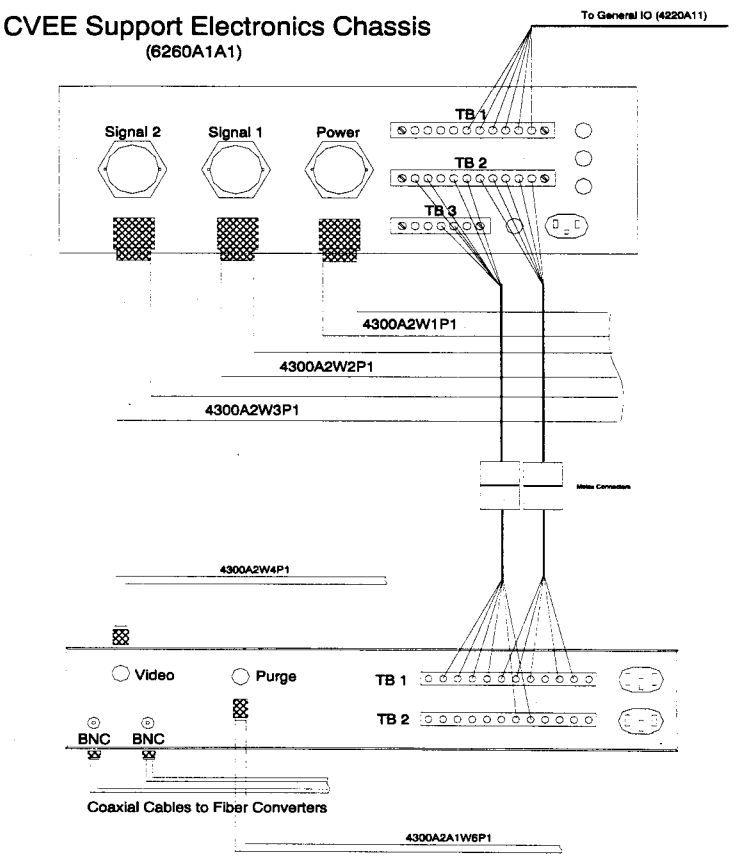

Figure 3 CVEE Connection Diagram

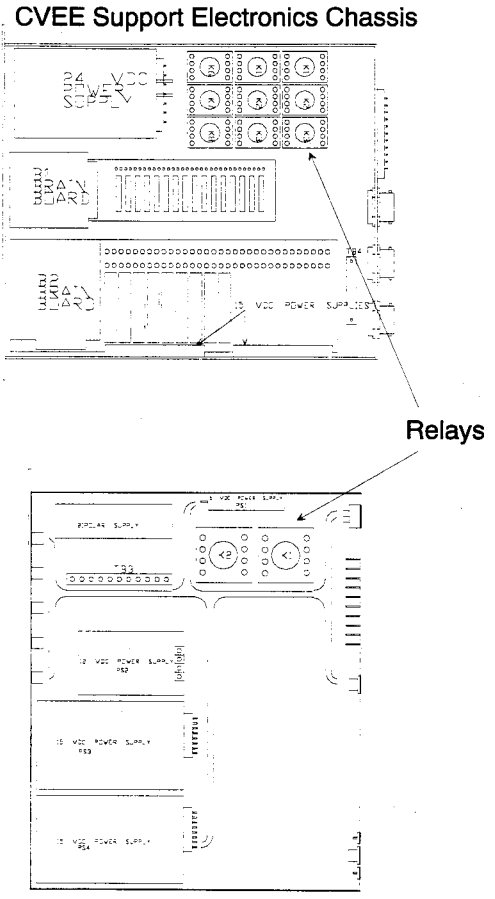

Figure 4 Relay Locations

APPENDIX B -- SPARE PARTS

The following is a recommended OEM spare parts list for the CVEE.

1) Relay, Potter and Brumfield, Model # KRPA11DG12

2) Relay, Potter and Brumfield, Model # KRPA6AG120